Puget Sound Naval Shipyard & Intermediate
Maintenance Facility Project ENVVEST
Community Advisory Committee Meeting
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Jackson Park Community Center
Bremerton, WA

Update on Fecal Coliform Technical Study
Presented by:

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Bremerton, WA

Update on Fecal Coliform Technical Study

- Introduction
- Highlights of Technical Study
  - Historical Data
  - Storm Event Monitoring
  - Landscape Analysis
  - Loading Analysis
- Next Steps
  - Modeling and Scenario Analysis
  - Develop Water Cleanup Plan

Beneficial Uses

- **Shellfish Harvest**
- **Fishing**
- **Contact Recreation**
  - **Swimming**
  - **Boating**
- **Aquatic Life (Fish & Wildlife Habitat)**
- **Shoreline Development**
- **Commercial & Industrial Activity**
  - **Shipping**
  - **Marinas**
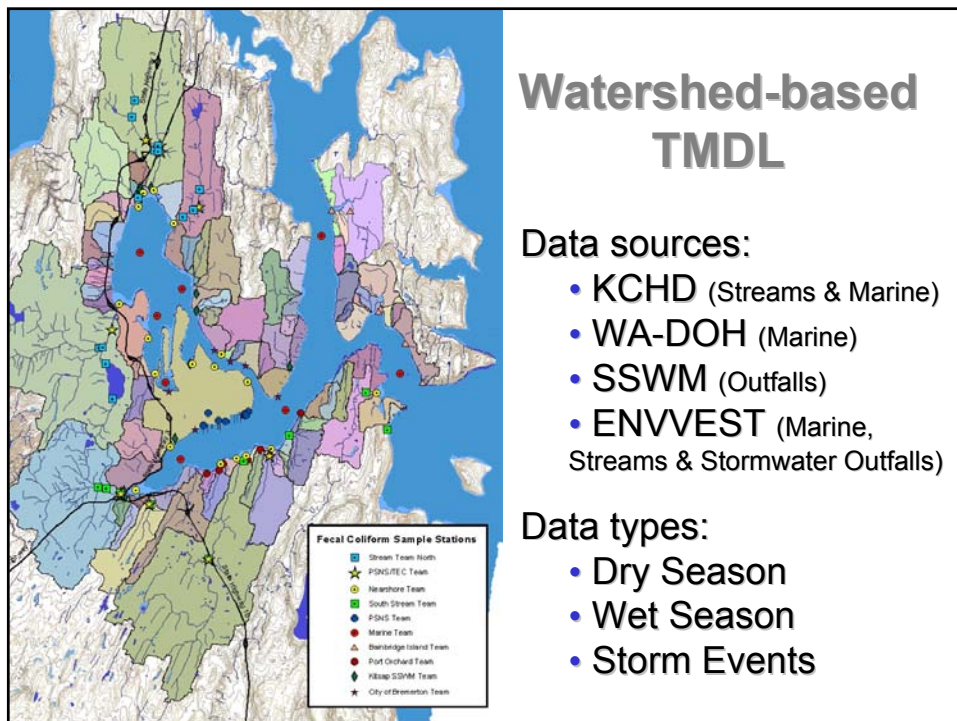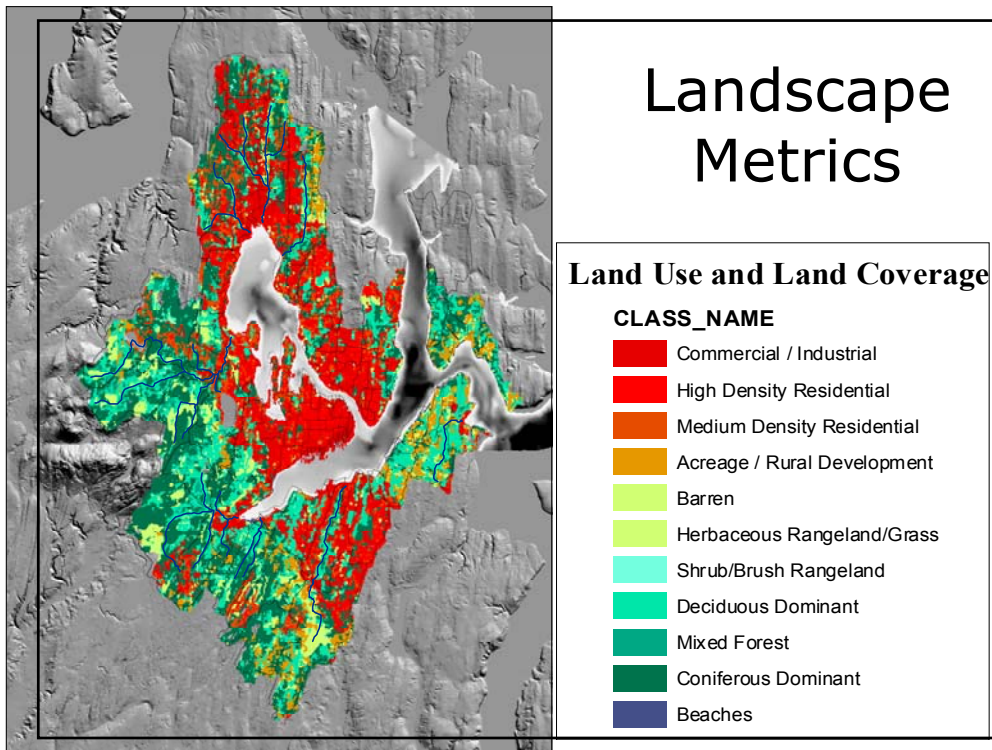 - **Shipyards**
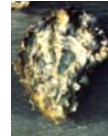
Water Quality Criteria

- Standards developed to protect beneficial uses (Shellfishing)
- PART 1: Average Concentration
  - 14 colony forming units per 100 ml
  - 14 cfu/100 ml (Marine)
  - 100 cfu/100 ml (Stream)
- PART 2: Spikes
  - No more than 10% of the samples can exceed
  - 43 cfu/100 ml (Marine)
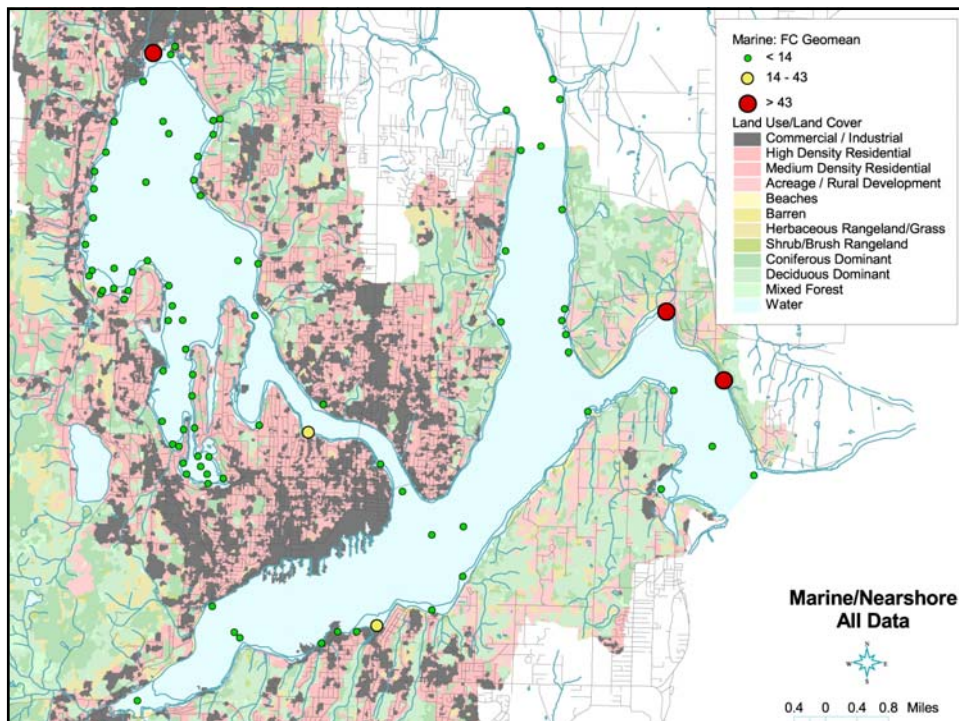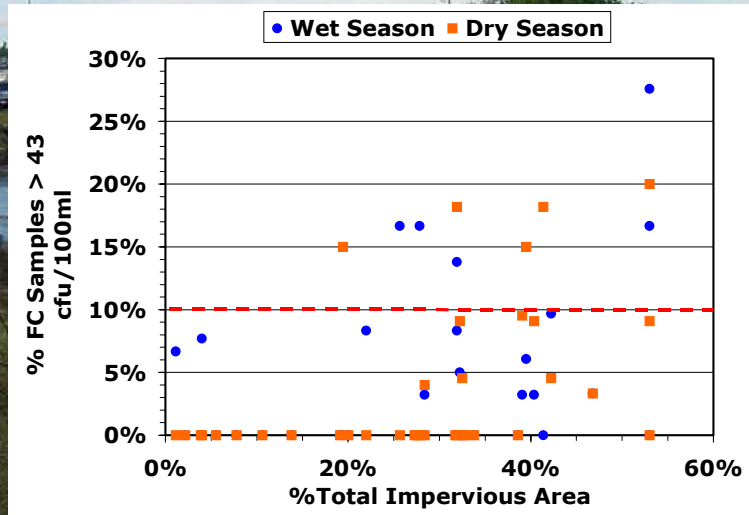 - 200 cfu/100 ml (Streams)

Data Analysis

- Historical Data
  - Kitsap County Health District (KCHD)
  - WA Department of Health (DOH)
  - Kitsap County Surface and Stormwater Management (SSWM)
- ENVVEST Storm Event Monitoring
  - Measure runoff during storm events
- Landscape Analysis
  - Relate water quality from runoff to landuse

Watershed-based TMDL

Data sources:
- KCHD (Streams & Marine)
- WA-DOH (Marine)
- SSWM (Outfalls)
- ENVVEST (Marine, Streams & Stormwater Outfalls)

Data types:
- Dry Season
- Wet Season
- Storm Events

Fecal Coliform Sample Stations
- Stream Team North
- PSNS/TEC Team
- Nearshore Team
- South Stream Team
- PSNS Team
- Marine Team
- Bainbridge Island Team
- Port Orchard Team
- Kitsap SSWM Team
- City of Bremerton Team

Landscape Metrics

Land Use and Land Coverage

CLASS_NAME

- Commercial / Industrial
- High Density Residential
- Medium Density Residential
- Acreage / Rural Development
- Barren
- Herbaceous Rangeland/Grass
- Shrub/Brush Rangeland
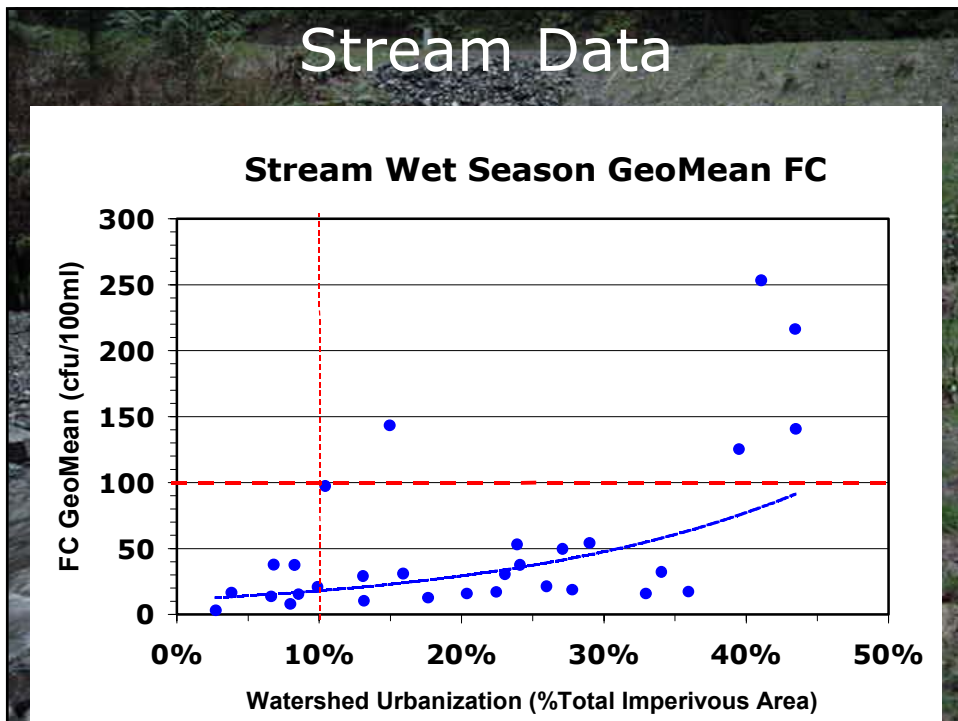- Deciduous Dominant
- Mixed Forest
- Coniferous Dominant
- Beaches

Nearshore & Marine

Nearshore & Marine

Stream Data

Stream Data

Stream Wet Season GeoMean FC

Y-axis: FC GeoMean (cfu/100ml)

X-axis: Watershed Urbanization (%Total Imperivous Area)

Streams: FC Geomean
- ○ < 100
- ● > 100, Part I WQS Violation

Streams: > 10% of samples over 200
- ○ Part II WQS Violation

Land Use/Land Cover
- Commercial / Industrial
- High Density Residential
- Medium Density Residential
- Acreage / Rural Development
- Beaches
- Barren
- Herbaceous Rangeland/Grass
- Shrub/Brush Rangeland
- Coniferous Dominant
- Deciduous Dominant
- Mixed Forest
- Water

**Streams
Dry Season**

0.75 0 0.75 1.5 Miles

Storm Water

Storm Water

Integrated Watershed and Receiving Water Model

- Simulate all sources
  Streams
  Storm Water
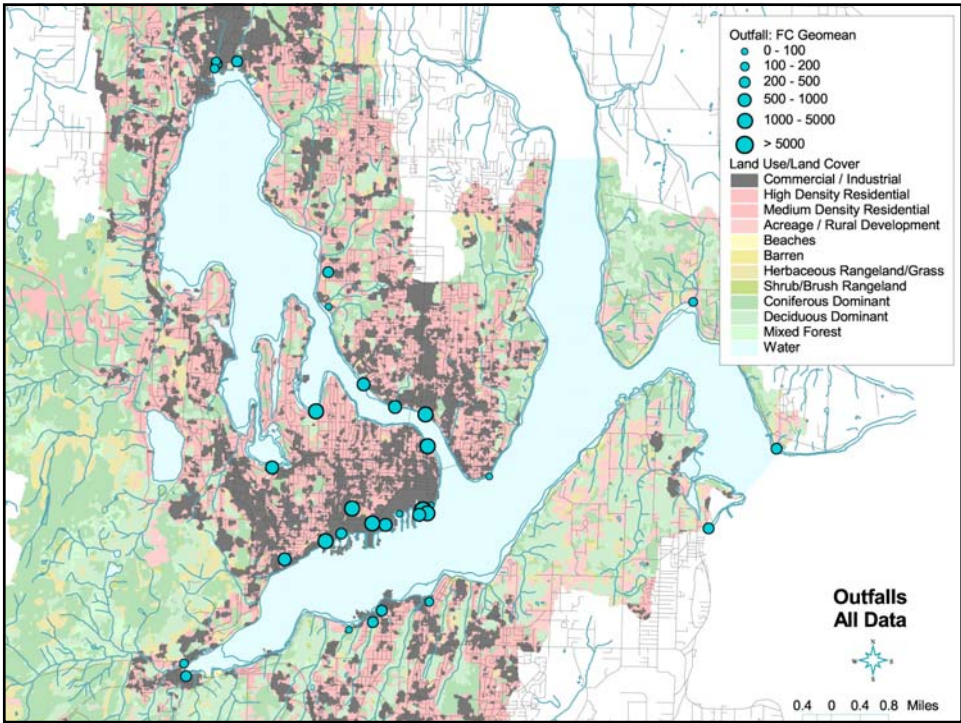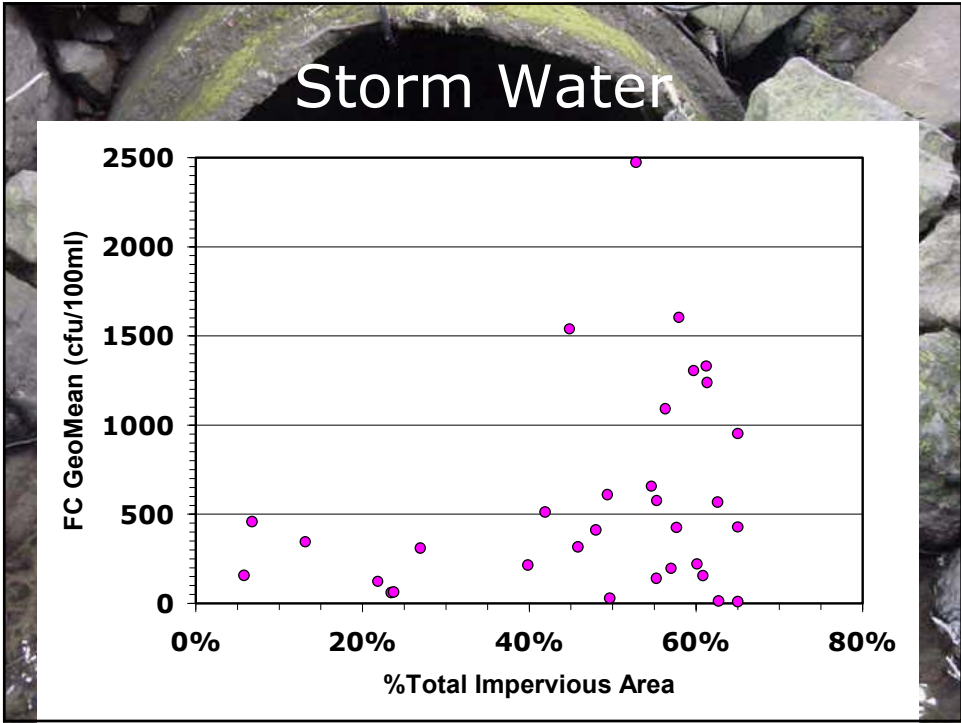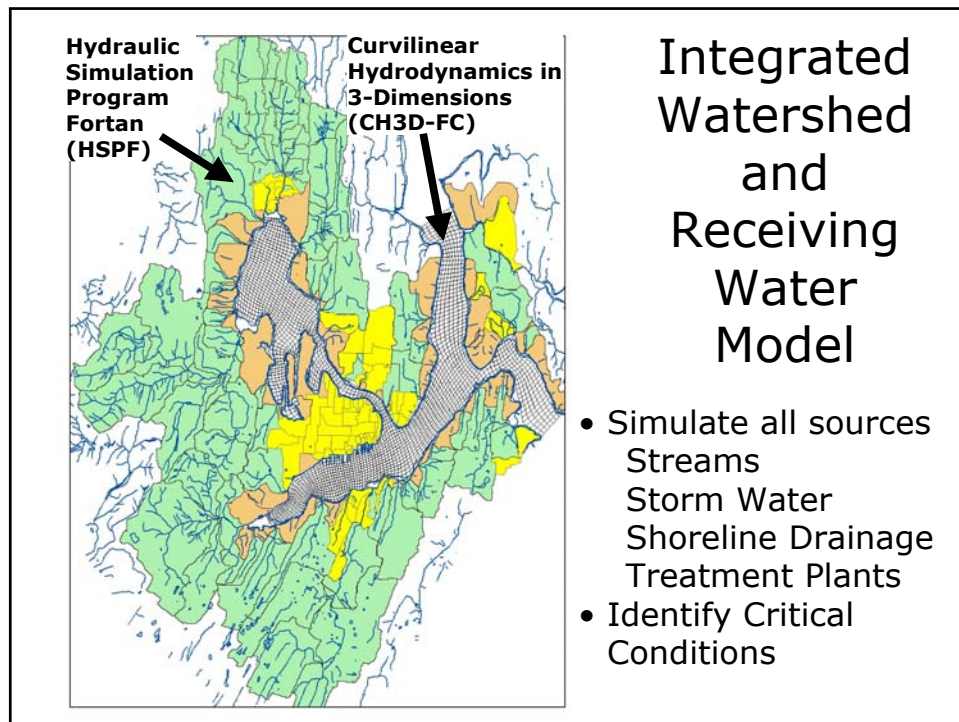 Shoreline Drainage
  Treatment Plants
- Identify Critical Conditions

Simulating FC Loading

- Flow Data
  - Volume of water discharged (cubic feet per second – cfs)
  - Only limited number of streams and storm water outfalls are gauged
  - Watershed model predicts flows for all "pour points"
- Concentration Data
  - FC cfu/100 ml being discharged
  - No data for many streams and outfalls
  - **Estimate concentration from existing data**
- Load = Flow x Concentration
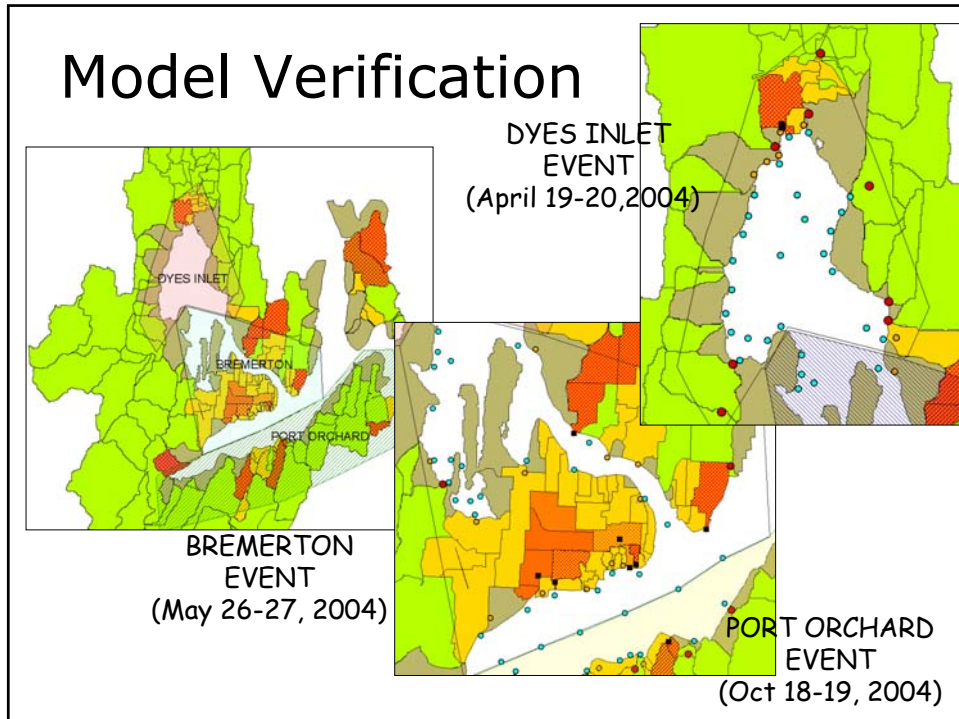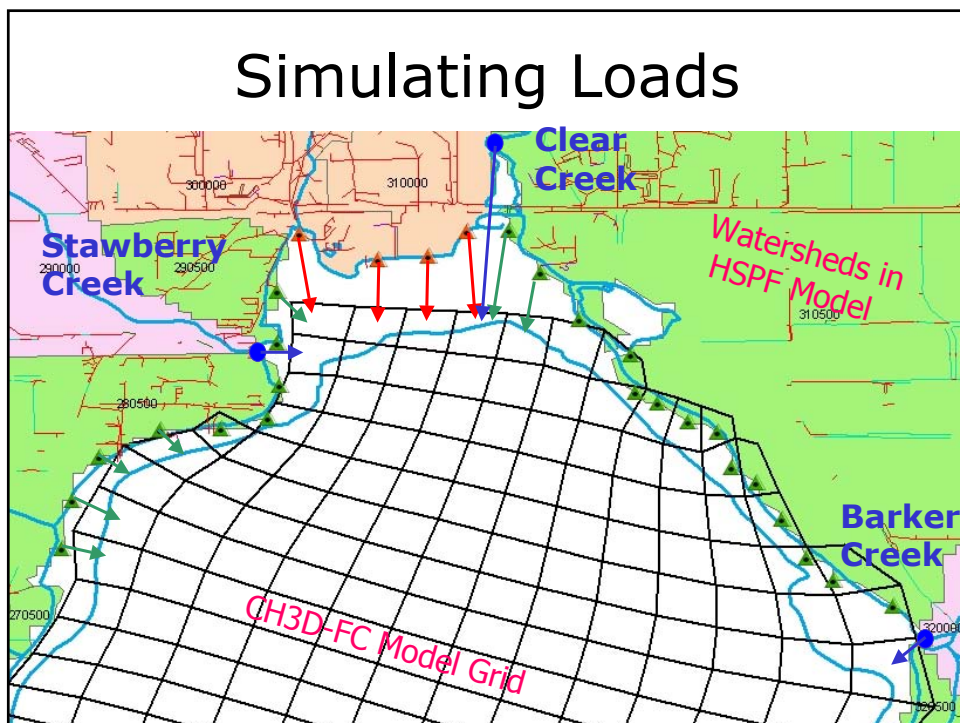 FC cfu/day (millions of counts)

Predicting FC Loading

Blackjack
Creek
(Mouth)

Millions of Fecal Coliform/Day

— Estimated from data
— Predicted
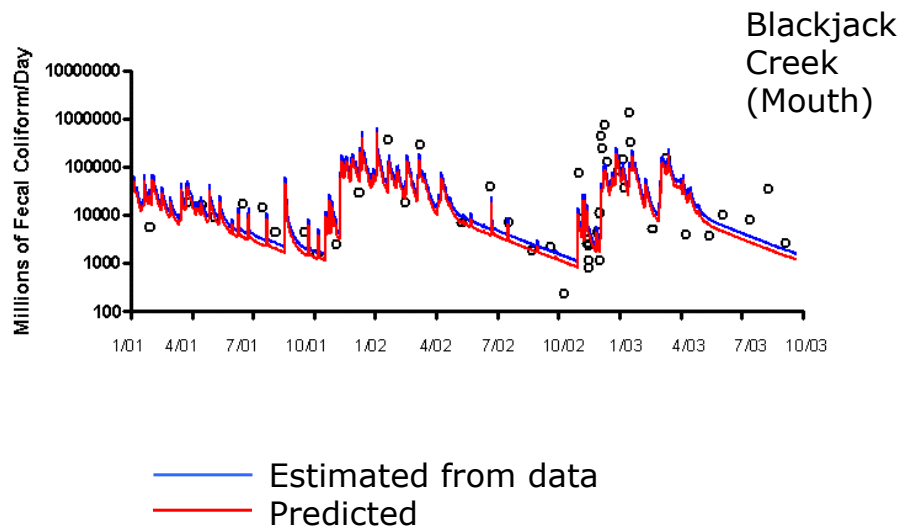
Next Steps

- Verify Integrated Model

- Conduct Scenario Analysis

- Develop Water Cleanup Plan

Model Verification

DYES INLET
EVENT
(April 19-20,2004)

BREMERTON
EVENT
(May 26-27, 2004)

PORT ORCHARD
EVENT
(Oct 18-19, 2004)

Simulating Loads

Clear Creek

Stawberry Creek

Watersheds in HSPF Model

Barker Creek

CH3D-FC Model Grid

Technical Reports

- An Analysis of Microbial Pollution in the Sinclair-Dyes Inlet Watershed
- Watershed Model Calibration Report for Streams and Storm Water
- Integrated Model Verification Report
- Simulation and Scenario Analysis Report